

NEW ENGLAND NOTE

A NEW COMBINATION IN *LYCOPODIELLA*
(LYCOPODIACEAE)

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Lycopodium L. *sensu lato* is currently considered to contain several distinct elements best treated as genera. Evidence for recognition of these segregate genera is provided by sporophyte, gametophyte, and spore morphology, anatomy, analysis of chromosome numbers, and phytochemicals (Bruce 1976; Ollgaard 1987; Pedersen and Ollgaard 1982; Towers and Maass 1965; Wagner and Beitel 1993). *Lycopodiella* Holub is a small group of wetland species with elongate horizontal shoots, unbranched upright shoots, apically leaf-like sporophylls, and photosynthetic gametophytes. A new combination is proposed for this genus.

Richard J. Eaton began a series of collections in 1928 of an unusual bog clubmoss from Concord, Massachusetts. The new *Lycopodiella* was robust with upright shoots commonly 14–17 cm tall. The margins of both the leaves and the sporophylls were toothed. The horizontal shoots were noteworthy in that they arched above the substrate. The strobilus represented a large proportion of the total upright shoot height (25–53%). Eaton (1931) noted that over a period of several years the colony increased in size. Using available evidence—unique combination of morphological characters and persistence of the colony—Eaton provided the new bog clubmoss with the name *Lycopodium inundatum* L. var. *robustum* R. J. Eaton (he used the genus *Lycopodium* because *Lycopodiella* was not held generically distinct at that time). Eaton probably chose to ally the new plant with *Lycopodium inundatum* on the basis of the relatively tall strobilus.

Gillespie (1962) and Kartesz (1994) considered the plants described by Eaton conspecific with *Lycopodiella* \times *copelandii* (Eiger) Cranfill, the hybrid of *Lycopodiella alopecuroides* (L.) Cranfill and *Lycopodiella appressa* (Chapm.) Cranfill. That nothospecies has ascending sporophylls and leaves of the upright shoot, strobili 4–11 mm thick, and each horizontal shoot segment com-

monly produces more than two upright shoots (Bruce 1976; Eiger 1956). Eaton's new plant, in contrast, had horizontally spreading sporophylls, spreading-ascending leaves of the upright shoot, thicker strobili (14–17 mm), and each horizontal shoot produced only one or two upright shoots (Eaton 1931; A. Haines, pers. obs.).

Throughout the description of the new bog clubmoss, Eaton (1931) compared various aspects of its morphology to *Lycopodiella alopecuroides* and *Lycopodiella inundata* (L.) Holub, but he never considered the plant to be of hybrid origin. The new taxon was, in fact, intermediate in many features, including the number of teeth on sporophyll and leaf margins, ratio of strobilus height to total upright shoot height, and length the stem arches to distal contact point. Further evidence for a hybrid origin of the variety described by Eaton is provided by examination of two sympatric populations of *L. alopecuroides* and *L. inundata* in south-central Maine (Haines 2001 and unpubl. data). Individuals intermediate between these two orthospecies were found at both locations and are conspecific with the plants from Concord, Massachusetts [29 Nov 2000, *Haines s.n.* (MAINE); 2 Sep 2001, *Haines s.n.* (MAINE, NEBC)]. Both Bruce (1976) and Tryon and Moran (1997) also considered the plants described by Eaton (1931) to be hybrids between *L. alopecuroides* and *L. inundata*. A new combination is needed under *Lycopodiella*.

Lycopodiella* × *robusta (R. J. Eaton) A. Haines, *comb. et stat. nov.*, pro variety. BASIONYM: *Lycopodium inundatum* L. var. *robustum* R. J. Eaton. *Rhodora* 33: 202, 1931. TYPE: UNITED STATES, Massachusetts: Middlesex Co., Concord, 28 Sep 1930, *Eaton s.n.* (NEBC).

As previously stated, *Lycopodium inundatum* var. *robustum* has been considered to be a synonym of *Lycopodiella* × *copelandii*. This erroneous synonymy may be the result of Eaton's interpretation of the former taxon. Approximately half of the Harvard University Herbaria specimens cited in the protologue of Eaton (1931) are in fact *L. ×copelandii*, as evidenced by the ascending sporophylls, narrow strobili, multiple upright shoots, thicker horizontal stems, and relatively few teeth on the sporophylls and leaves of the horizontal shoots. The following specimens are entirely *L. ×copelandii*: *Eames 5860* (GH); *Fernald 8381* (NEBC); *Fernald 15,851* (NEBC); *Fernald & Long 15,939* (NEBC). It should

be noted that one of the paratypes [*Hoffman s.n.* (NEBC)] contains two taxa, only one of which is *L. ×robusta* (the other is *L. inundata*). Also, one of the isotypes at GH contains three taxa, only one of which is *L. ×robusta* (the others are *L. alopecuroides* and *L. ×copelandii*). The type is, however, wholly and unambiguously *L. ×robusta*.

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LITERATURE CITED

- BRUCE, J. G. 1976. Systematics and morphology of subgenus *Lepidotis* of the genus *Lycopodium* (Lycopodiaceae). Ph.D. dissertation, Univ. Michigan, Ann Arbor, MI.
- EATON, R. J. 1931. Notes on *Lycopodium inundatum* and its allies in the western hemisphere. *Rhodora* 33: 201–203.
- EIGER, J. 1956. A hybrid *Lycopodium*. *Biol. Rev.* 18: 17–22.
- GILLESPIE, J. P. 1962. A theory of relationships in the *Lycopodium inundatum* complex. *Amer. Fern J.* 52: 19–26.
- HAINES, A. 2001. Discovery of two new *Lycopodiella* (Lycopodiaceae) in Maine. *Rhodora* 103: 431–434.
- KARTESZ, J. 1994. A Synonomized Checklist of the Vascular Flora of the United States, Canada, and Greenland, 2 vols, 2nd ed. Timber Press, Portland, OR.
- OLLGAARD, B. 1987. A revised classification of the Lycopodiaceae *sensu lato*. *Opera Bot.* 92: 153–178.
- PEDERSEN, J. A. AND B. OLLGAARD. 1982. Phenolic acids in the genus *Lycopodium*. *Biochem. Syst. & Ecol.* 10: 3–9.
- TOWERS, G. H. N. AND W. S. G. MAASS. 1965. Phenolic acids and lignins in the Lycopodiales. *Phytochemistry* 4: 57–66.
- TRYON, A. F. AND R. C. MORAN. 1997. The Ferns and Allied Plants of New England. Massachusetts Audubon Society, Lincoln, MA.
- WAGNER, W. H. AND J. BEITEL. 1993. Lycopodiaceae, pp. 18–37. *In*: Flora of North America North of Mexico, Vol. 2. Flora of North America Editorial Committee, eds., Oxford Univ. Press, Oxford and New York.